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REMARKS

This paper is responsive to Non-Final Office Action dated November 20, 2003. Claims 1-29 were examined. Claims 1-29 stand rejected under 35 U.S.C. § 112, second paragraph. Claims 1-2, 14-17, and 23-26 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,353,918 to Carothers et al. Claims 1, 15, 16, and 24 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,292,928 to Yamaguchi et al.

Allowable Subject Matter

Applicants appreciate the indication of allowable subject matter in claims 3-13, 18-22, and 27-29. Applicants believe that these claims depend from allowable claims and are allowable for at least this reason.

Rejections Under 35 U.S.C. § 112, second paragraph

Claims 1-29 stand rejected under 35 U.S.C. § 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. The Office Action states that “[i]f ‘the plurality of layers’ and ‘other (routing/circuit) layer(s)’ are different features that the applicant relies upon; then the different features must be clearly defined in claim 1, and similarly recited claims 15-16, 24.” Regarding claim 1, Applicants respectfully maintain that the claim meets the threshold requirements of clarity and precision required by 35 U.S.C. § 112, second paragraph. Claim 1 recites that “individual ones of the plurality of subgraphs correspond to respective ones of a plurality of layers of circuitry.” Claim 1 has been amended to recite “the individual subgraphs including a plurality of segments based on information from other layers of circuitry.” Since individual ones of the plurality of subgraphs are claimed to correspond to respective ones of the plurality of layers of circuitry, one of ordinary skill in the art would understand that “a plurality of segments based on information from other layers of circuitry” is directed to a plurality of segments based on information from layers of circuitry other than the layer of circuitry corresponding to the respective subgraph. “When not defined by applicant in the specification, the words of a claim must be given their plain meaning.” See MPEP § 2111.01. So construed, the claims are both clear and definite as required by 35 U.S.C. § 112. Thus, withdrawal of the rejection of claim 1 and all claims dependent thereon is respectfully requested.

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In addition, the Office Action states that Applicants "must clearly define in these claims how 'subgraphs (correspond to layers of circuitry) including a plurality of segments based on information from other layers of circuitry.' First, claims do not details [sic] invention but claims must define the invention. Second, although the claims are interpreted in light of the specification, limitations are not read into the claims." Applicants do not understand the basis of this rejection. The statement that the claims must explain "how 'subgraphs (correspond to layers of circuitry) including a plurality of segments based on information from other layers of circuitry' [sic]" is mistaken and is not required by 35 U.S.C. § 112. To the extent that the Examiner is concerned with the breadth of the claims, Applicants respectfully maintain that claim 1 satisfies the requirements of 35 U.S.C. § 112, second paragraph.

Breadth of a claim is not to be equated with indefiniteness. *In re Miller*, 441 F.2d 689, 169 USPQ 597 (CCPA 1971). If the scope of the subject matter embraced by the claims is clear, and if applicants have not otherwise indicated that they intend the invention to be of a scope different from that defined in the claims, then the claims comply with 35 U.S.C. 112, second paragraph.

MPEP § 2173.04. The method of claim 1 is directed to generating a plurality of subgraphs, wherein individual ones of the plurality of subgraphs correspond to respective ones of a plurality of layers of circuitry, the individual subgraphs including a plurality of segments based on information from other layers of circuitry. Claim 1 clearly defines the scope of the subject matter claimed. Accordingly, Applicants respectfully request that the rejection of independent claim 1 and all claims dependent thereon be withdrawn.

Regarding claim 15, Applicants respectfully maintain that the claim meets the threshold requirements of clarity and precision required by 35 U.S.C. § 112, second paragraph. See MPEP § 2173.02. Claim 15 recites "generating a subgraph corresponding to a routing layer and including a plurality of route segments based on information from the corresponding routing layer and a plurality of route segments based on information from other routing layers." Since the subgraph corresponds to a routing layer, one of ordinary skill in the art would understand that the subgraph includes a plurality of route segments based on information from that routing layer and that the subgraph also includes a plurality of route segments based on information from routing layers other than that routing layer. "When not defined by applicant in the specification, the words of a claim must be given their plain meaning." See MPEP § 2111.01. So construed,

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the claims are both clear and definite as required by 35 U.S.C. § 112. Thus, withdrawal of the rejection of claim 15 and all claims dependent thereon is respectfully requested.

In addition, the Office Action states that Applicants "must clearly define in these claims how 'subgraphs (correspond to layers of circuitry) including a plurality of segments based on information from other layers of circuitry.' First, claims do not details [sic] invention but claims must define the invention. Second, although the claims are interpreted in light of the specification, limitations are not read into the claims." Applicants do not understand the basis of this rejection. The statement that the claims must explain "how 'subgraphs (correspond to layers of circuitry) including a plurality of segments based on information from other layers of circuitry' [sic]" is mistaken and is not required by 35 U.S.C. § 112. To the extent that the Examiner is concerned with the breadth of the claims, Applicants respectfully maintain that claim 15 satisfies the requirements of 35 U.S.C. § 112, second paragraph.

Breadth of a claim is not to be equated with indefiniteness. *In re Miller*, 441 F.2d 689, 169 USPQ 597 (CCPA 1971). If the scope of the subject matter embraced by the claims is clear, and if applicants have not otherwise indicated that they intend the invention to be of a scope different from that defined in the claims, then the claims comply with 35 U.S.C. 112, second paragraph.

MPEP § 2173.04. The method of claim 15 includes generating a subgraph corresponding to a routing layer and including a plurality of route segments based on information from the corresponding routing layer and a plurality of route segments based on information from other routing layers. Claim 15 clearly defines the scope of the subject matter claimed. Accordingly, Applicants respectfully request that the rejection of independent claim 15 and all claims dependent thereon be withdrawn.

Regarding claim 16, Applicants respectfully maintain that the claim meets the threshold requirements of clarity and precision required by 35 U.S.C. § 112, second paragraph. See MPEP § 2173.02. Claim 16 recites that "individual ones of the plurality of subgraphs correspond to respective ones of a plurality of layers of the routing data." Claim 16 has been amended to recite "the individual subgraphs including a plurality of segments based on information from other layers of the routing data." Since individual ones of the plurality of subgraphs are claimed to correspond to respective ones of the plurality of layers of the routing data, one of ordinary skill

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in the art would understand that “a plurality of segments based on information from other layers of the routing data” is directed to a plurality of segments based on information from layers of routing data other than the layer of circuitry corresponding to the respective subgraph. “When not defined by applicant in the specification, the words of a claim must be given their plain meaning.” See MPEP § 2111.01. So construed, the claims are both clear and definite as required by 35 U.S.C. § 112. Thus, withdrawal of the rejection of claim 16 and all claims dependent thereon is respectfully requested.

In addition, the Office Action states that Applicants “must clearly define in these claims how ‘subgraphs (correspond to layers of circuitry) including a plurality of segments based on information from other layers of circuitry.’ First, claims do not details [sic] invention but claims must define the invention. Second, although the claims are interpreted in light of the specification, limitations are not read into the claims.” Applicants do not understand the basis of this rejection. The statement that the claims must explain “how ‘subgraphs (correspond to layers of circuitry) including a plurality of segments based on information from other layers of circuitry’ [sic]” is mistaken and is not required by 35 U.S.C. § 112. To the extent that the Examiner is concerned with the breadth of the claims, Applicants respectfully maintain that claim 16 satisfies the requirements of 35 U.S.C. § 112, second paragraph.

Breadth of a claim is not to be equated with indefiniteness. *In re Miller*, 441 F.2d 689, 169 USPQ 597 (CCPA 1971). If the scope of the subject matter embraced by the claims is clear, and if applicants have not otherwise indicated that they intend the invention to be of a scope different from that defined in the claims, then the claims comply with 35 U.S.C. 112, second paragraph.

MPEP § 2173.04. The product of claim 16 includes a first module for generating a plurality of subgraphs, wherein individual ones of the plurality of subgraphs correspond to respective ones of a plurality of layers of the routing data, the individual subgraphs including a plurality of segments based on information from other layers of the routing data. Claim 16 clearly defines the scope of the subject matter claimed. Accordingly, Applicants respectfully request that the rejection of independent claim 16 and all claims dependent thereon be withdrawn.

Regarding claim 24, Applicants respectfully maintain that the claim meets the threshold requirements of clarity and precision required by 35 U.S.C. § 112, second paragraph. See MPEP

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§ 2173.02. Claim 24 recites “a first subgraph corresponding to a first circuit layer, the first subgraph including a set of routing segments selected using information from the first circuit layer and at least one other circuit layer.” Since the first subgraph corresponds to a first circuit layer, one of ordinary skill in the art would understand that the first subgraph includes a set of routing segments selected using information from the first circuit layer and information from at least one circuit layer other than the first circuit layer. “When not defined by applicant in the specification, the words of a claim must be given their plain meaning.” See MPEP § 2111.01. So construed, the claims are both clear and definite as required by 35 U.S.C. § 112. Thus, withdrawal of the rejection of claim 24 and all claims dependent thereon is respectfully requested.

In addition, the Office Action states that Applicants “must clearly define in these claims how ‘subgraphs (correspond to layers of circuitry) including a plurality of segments based on information from other layers of circuitry.’ First, claims do not details [sic] invention but claims must define the invention. Second, although the claims are interpreted in light of the specification, limitations are not read into the claims.” Applicants do not understand the basis of this rejection. The statement that the claims must explain “how ‘subgraphs (correspond to layers of circuitry) including a plurality of segments based on information from other layers of circuitry’ [sic]” is mistaken and is not required by 35 U.S.C. § 112. To the extent that the Examiner is concerned with the breadth of the claims, Applicants respectfully maintain that claim 24 satisfies the requirements of 35 U.S.C. § 112, second paragraph.

Breadth of a claim is not to be equated with indefiniteness. In re Miller, 441 F.2d 689, 169 USPQ 597 (CCPA 1971). If the scope of the subject matter embraced by the claims is clear, and if applicants have not otherwise indicated that they intend the invention to be of a scope different from that defined in the claims, then the claims comply with 35 U.S.C. 112, second paragraph.

MPEP § 2173.04. The graph of claim 24 includes a first subgraph corresponding to a first circuit layer, the first subgraph including a set of routing segments selected using information from the first circuit layer and at least one other circuit layer and clearly defines the scope of the subject matter claimed. Accordingly, Applicants respectfully request that the rejection of independent claim 24 be withdrawn.

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Art Rejections Under 35 U.S.C. § 102(e)

Claims 1-2, 14-17, and 23-26 stand rejected under 35. U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,353,918 to Carothers et al. Regarding claim 1, Applicants respectfully maintain that Carothers, alone or in combination with other references of record, fails to teach or suggest

generating a plurality of subgraphs, wherein individual ones of the plurality of subgraphs correspond to respective ones of a plurality of layers of circuitry, the individual subgraphs including a plurality of segments based on information from other layers of circuitry,

as recited by amended claim 1. The Office Action relies on Figures 5, 16-37 and col. 15-16 of Carothers to supply this teaching. These portions of Carothers teach at col. 9, line 62-col. 10, line 4, that

a suitable compatibility graph is generated by representing each candidate route as a vertex in a matrix (step 1208). For example, each net is suitably associated with four candidate routes. Each net corresponds to a column 1312 in the graph, and each candidate route for the net is represented by a corresponding vertex 1310 in the matrix under the corresponding net's column.

The compatibility graph of Carothers fails to teach or suggest subgraphs including a plurality of segments based on information from other layers of circuitry, as required by claim 1.

In addition, Carothers teaches redistributing routes from one layer pair (i.e., a layer of conductive material and corresponding insulating layer) to another using a layer balancing procedure (col. 15-16). Carothers' congestion graph includes vertices corresponding to each route associated with a particular layer pair. (Col. 15, line 67- col. 16, line1). The congestion graph also includes an edge associated with two routes corresponding to the vertices. The edge is assigned a congestion weight based on individual segments of a route. (Col. 16, lines 1-48) The congestion graph of Carothers fails to teach or suggest individual subgraphs including a plurality of segments based on information from other layers of circuitry, as required by claim 1.

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Thus, Carothers, alone or in combination with other references of record, fails to teach or suggest the limitations of claim 1. Accordingly, Applicants respectfully request that the rejection of independent claim 1 and all claims dependent thereon be withdrawn.

Regarding claim 15, Applicants respectfully maintain that Carothers, alone or in combination with other references of record, fails to teach or suggest

generating a subgraph corresponding to a routing layer and including a plurality of route segments based on information from the corresponding routing layer and a plurality of route segments based on information from other routing layers

as recited in claim 15. The Office Action relies on Figures 5, 16-37 and col. 15-16 of Carothers to supply this teaching. These portions of Carothers teach at col. 9, line 62-col. 10, line 4, that

a suitable compatibility graph is generated by representing each candidate route as a vertex in a matrix (step 1208). For example, each net is suitably associated with four candidate routes. Each net corresponds to a column 1312 in the graph, and each candidate route for the net is represented by a corresponding vertex 1310 in the matrix under the corresponding net's column.

The compatibility graph of Carothers fails to teach or suggest a subgraph corresponding to a routing layer and including a plurality of route segments based on information from the corresponding routing layer and a plurality of route segments based on information from other routing layers, as required by claim 15.

In addition, Carothers teaches redistributing routes from one layer pair (i.e., a layer of conductive material and corresponding insulating layer) to another using a layer balancing procedure (col. 15-16). Carothers' congestion graph includes vertices corresponding to each route associated with a particular layer pair. (Col. 15, line 67- col. 16, line1). The congestion graph also includes an edge associated with two routes corresponding to the vertices. The edge is assigned a congestion weight based on individual segments of a route. (Col. 16, lines 1-48) The congestion graph of Carothers fails to teach or suggest a subgraph corresponding to a routing layer and including a plurality of route segments based on information from the

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corresponding routing layer and a plurality of route segments based on information from other routing layers, as required by claim 15.

Thus, Carothers, alone or in combination with other references of record, fails to teach or suggest the limitations of claim 15. Accordingly, Applicants respectfully request that the rejection of independent claim 15 and all claims dependent thereon be withdrawn.

Regarding claim 16, Applicants respectfully maintain that Carothers, alone or in combination with other references of record, fails to teach or suggest

a first module for generating a plurality of subgraphs, wherein individual ones of the plurality of subgraphs correspond to respective ones of a plurality of layers of the routing data, the individual subgraphs including a plurality of segments based on information from other layers of the routing data

as recited by amended claim 16. The Office Action relies on Figures 5, 16-37 and col. 15-16 of Carothers to supply this teaching. These portions of Carothers teach at col. 9, line 62-col. 10, line 4, that

a suitable compatibility graph is generated by representing each candidate route as a vertex in a matrix (step 1208). For example, each net is suitably associated with four candidate routes. Each net corresponds to a column 1312 in the graph, and each candidate route for the net is represented by a corresponding vertex 1310 in the matrix under the corresponding net's column.

The compatibility graph of Carothers fails to teach or suggest a plurality of subgraphs including a plurality of segments based on information from other layers of circuitry, as required by claim 16.

In addition, Carothers teaches redistributing routes from one layer pair (i.e., a layer of conductive material and corresponding insulating layer) to another using a layer balancing procedure (col. 15-16). Carothers' congestion graph includes vertices corresponding to each route associated with a particular layer pair. (Col. 15, line 67- col. 16, line1). The congestion graph also includes an edge associated with two routes corresponding to the vertices. The edge

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is assigned a congestion weight based on individual segments of a route. (Col. 16, lines 1-48)
The congestion graph of Carothers fails to teach or suggest a plurality of subgraphs including a plurality of segments based on information from other layers of circuitry, as required by claim 16.

Thus, Carothers, alone or in combination with other references of record, fails to teach or suggest the limitations of claim 16. Accordingly, Applicants respectfully request that the rejection of independent claim 16 and all claims dependent thereon be withdrawn.

Regarding claim 24, Applicants respectfully maintain that Carothers, alone or in combination with other references of record, fails to teach or suggest

a first subgraph corresponding to a first circuit layer, the first subgraph including a set of routing segments selected using information from the first circuit layer and at least one other circuit layer,

as recited by claim 24. The Office Action relies on Figures 5, 16-37 and col. 15-16 of Carothers to supply this teaching. These portions of Carothers teach at col. 9, line 62-col. 10, line 4, that

a suitable compatibility graph is generated by representing each candidate route as a vertex in a matrix (step 1208). For example, each net is suitably associated with four candidate routes. Each net corresponds to a column 1312 in the graph, and each candidate route for the net is represented by a corresponding vertex 1310 in the matrix under the corresponding net's column.

The compatibility graph of Carothers fails to teach or suggest a first subgraph corresponding to a first circuit layer, the first subgraph including a set of routing segments selected using information from the first circuit layer and at least one other circuit layer, as required by claim 24.

In addition, Carothers teaches redistributing routes from one layer pair (i.e., a layer of conductive material and corresponding insulating layer) to another using a layer balancing procedure (col. 15-16). Carothers' congestion graph includes vertices corresponding to each route associated with a particular layer pair. (Col. 15, line 67- col. 16, line 1). The congestion graph also includes an edge associated with two routes corresponding to the vertices. The edge

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is assigned a congestion weight based on individual segments of a route. (Col. 16, lines 1-48) The congestion graph of Carothers fails to teach or suggest a first subgraph corresponding to a first circuit layer, the first subgraph including a set of routing segments selected using information from the first circuit layer and at least one other circuit layer, as required by claim 24.

Thus, Carothers, alone or in combination with other references of record, fails to teach or suggest the limitations of claim 24. Accordingly, Applicants respectfully request that the rejection of independent claim 24 and all claims dependent thereon be withdrawn.

Claims 1, 15, 16, and 24 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,292,928 to Yamaguchi et al. Regarding claim 1, Applicants respectfully maintain that Yamaguchi, alone or in combination with other references of record, fails to teach or suggest

generating a plurality of subgraphs, wherein individual ones of the plurality of subgraphs correspond to respective ones of a plurality of layers of circuitry, the individual subgraphs including a plurality of segments based on information from other layers of circuitry.

as recited by amended claim 1. The Office Action relies on Figures 2, 4, and 6, and col. 3, 5, and 7 of Yamaguchi to supply this teaching. These portions of Yamaguchi teach routing graphs including edges with a passage cost using line lengths. (Col. 5, lines 30-64; col. 7, lines 30-38) The edges may correspond to different interconnect layers. (Col. 7, lines 30-38) Yamaguchi fails to teach subgraphs including a plurality of segments based on information from other layers of circuitry, as required by claim 1. Thus, Yamaguchi alone or in combination with other references of record, fails to teach or suggest the limitations of claim 1. Accordingly, Applicants respectfully request that the rejection of independent claim 1 and all claims dependent thereon be withdrawn.

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Regarding claim 15, Applicants respectfully maintain that Yamaguchi, alone or in combination with other references of record, fails to teach or suggest

generating a subgraph corresponding to a routing layer and including a plurality of route segments based on information from the corresponding routing layer and a plurality of route segments based on information from other routing layers

as recited in claim 15. The Office Action relies of Figures 2, 4, and 6, and col. 3, 5, and 7 of Yamaguchi to supply this teaching. These portions of Yamaguchi teach routing graphs including edges with a passage cost using line lengths. (Col. 5, lines 30-64; col. 7, lines 30-38) The edges may correspond to different interconnect layers. (Col. 7, lines 30-38) Yamaguchi fails to teach generating a subgraph corresponding to a routing layer and including a plurality of route segments based on information from the corresponding routing layer and a plurality of route segments based on information from other routing layers as required by claim 15. Thus, Yamaguchi alone or in combination with other references of record, fails to teach or suggest the limitations of claim 15. Accordingly, Applicants respectfully request that the rejection of independent claim 15 and all claims dependent thereon be withdrawn.

Regarding claim 16, Applicants respectfully maintain that Yamaguchi, alone or in combination with other references of record, fails to teach or suggest

a first module for generating a plurality of subgraphs, wherein individual ones of the plurality of subgraphs correspond to respective ones of a plurality of layers of the routing data, the individual subgraphs including a plurality of segments based on information from other layers of the routing data

as recited by claim 16. The Office Action relies of Figures 2, 4, and 6, and col. 3, 5, and 7 of Yamaguchi to supply this teaching. These portions of Yamaguchi teach routing graphs including edges with a passage cost using line lengths. (Col. 5, lines 30-64; col. 7, lines 30-38) The edges

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may correspond to different interconnect layers. (Col. 7, lines 30-38) Yamaguchi fails to teach or suggest a plurality of subgraphs including a plurality of segments based on information from other layers of routing data, as required by claim 16. Thus, Yamaguchi alone or in combination with other references of record, fails to teach or suggest the limitations of claim 16.

Accordingly, Applicants respectfully request that the rejection of independent claim 16 and all claims dependent thereon be withdrawn.

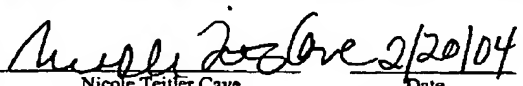
Regarding claim 24, Applicants respectfully maintain that Yamaguchi, alone or in combination with other references of record, fails to teach or suggest

a first subgraph corresponding to a first circuit layer, the first subgraph including a set of routing segments selected using information from the first circuit layer and at least one other circuit layer,

as recited by claim 24. The Office Action relies on Figures 2, 4, and 6, and col. 3, 5, and 7 of Yamaguchi to supply this teaching. These portions of Yamaguchi teach routing graphs including edges with a passage cost using line lengths. (Col. 5, lines 30-64; col. 7, lines 30-38) The edges may correspond to different interconnect layers. (Col. 7, lines 30-38) Yamaguchi fails to teach a subgraph including a set of routing segments selected using information from the first circuit layer and at least one other circuit layer, as required by claim 24. Thus, Yamaguchi alone or in combination with other references of record, fails to teach or suggest the limitations of claim 24. Accordingly, Applicants respectfully request that the rejection of independent claim 24 be withdrawn.

In summary, claims 1-29 are in the case. All claims are believed to be allowable over the art of record, and a Notice of Allowance to that effect is respectfully solicited. Nonetheless, if any issues remain that could be more efficiently handled by telephone, the Examiner is requested to call the undersigned at the number listed below.

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Respectfully submitted,



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